MULTIMEDIA UNIVERSITY

STUDENT ID NO

MULTIMEDIA UNIVERSITY

FINAL EXAMINATION

TRIMESTER 3, 2016/2017 SESSION

TCE 2311 – DATA COMMUNICATIONS AND NETWORKING

(All Sections / Groups)

26 MAY 2017
9:00 a.m – 11:00 a.m
(2 Hours)

INSTRUCTIONS TO STUDENTS

1. This Question paper consists of 3 printed pages including cover page with 6 questions only.
2. Attempt **ALL** questions. All questions carry equal marks and the distribution of marks for each question is given.
3. Please write all your answers in the Answer Booklet provided

Question 1

Corresponding to each of the OSI layers in the table below, find the answers for (i) to (x). (10 marks)

OSI Layers	Data Encapsulation	Address Information	Protocol	Internetworking Device
Application				
Presentation				
Session	(i)			
Transport	Segment	(iv)	(vi) (vii)	
Network	(ii)	(v)	IP	Routers
Data Link	Frames	Physical Address		(ix)
Physical	(iii)			(x)

Question 2

a) A digital signal has 16 levels and it is capable of sending 6400 bps. Show your workout for the following questions.
   i) How many bits are sent per level? (2 marks)
   ii) What is the bit interval? (2 marks)
   iii) Calculate the baud rate. (2 marks)

b) What is the sampling rate needed for a signal with a frequency ranged from 10,000Hz to 12,000Hz? (1 mark)

c) The human voice contains frequency ranged from 300Hz to 3400Hz. What is the bit rate, assuming 8 bits per sample, after digitizing the voice? (2 marks)

d) The following is the quantized value after Pulse Code Modulation. Convert the value into a stream of bits. (1 mark)
   +039

Question 3

a) Four channels are multiplexed into a high speed link using TDM. The transmission rate for each channel is 1000 bytes/s. 10 bytes from each channel are multiplexed to form a frame. Calculate and show your workout for
   i) the size of the frame (1 mark)
   ii) the bit rate for the link (1 mark)
   iii) the frame rate (1 mark)
   iv) the duration of a frame (1 mark)

b) Wireless Media A has high frequencies in transmissions. State one advantage and one disadvantage of using A as transmission medium. (2 marks)

c) What is the disadvantage of using radio wave, which has the omni-directional property in transmission? (2 marks)

d) Two workstations are connected with a distance around 150m but the maximum cable length of the UTP cable used is only 100m. Suggest a way to solve the problem. (1 mark)

e) What is the maximum cable length for 10BaseF? (1 mark)

Continued...

Question 4

a) The stop-and-wait ARQ can be used in bidirectional transmission utilizing piggybacking method. What is piggybacking method and how it is used to save bandwidth? (2 marks)
b) In bit stuffing, what is the action taken by the receiver when it reads the incoming bits. (4 marks)
c) In Selective-Reject ARQ protocol with a window size of four, calculate worst case scenario the time taken to send one million bits of data if each frame carries 1000 bits. The distance between the sender and receiver is 5000km and the propagation speed is $2x10^8$ m/s. Assume that the data rate is 1 Mbps and no frame is lost or damaged in the transit. (4 marks)

Question 5

a) A feature of Fast Ethernet is auto-negotiation. What is auto-negotiation? State three purposes of auto-negotiation. (4 marks)
b) What are the data rates of Standard Ethernet, Fast Ethernet and Gigabit Ethernet? (3 marks)
c) An Ethernet MAC sublayer receives 1510 bytes of data from the upper layer. How many frames need to be sent? What is the size of data in each frame? (3 mark)

Question 6

a) Given the IP address, 174.24.13.5/19, determine the following for the subnet it originates from. Show your workout.
   i) Class of this IP address. (1 mark)
   ii) Network mark of this IP address. (1 mark)
   iii) Subnet mask (1 mark)
   iv) Subnet address (2 marks)
   v) Broadcast address (1 mark)
   vi) The range of useful IP addresses (1 mark)
b) Give one example for each of the following. (3 marks)
   i) Broadcast address
   ii) Multicast address
   iii) Unicast address

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